

ANOTHER SPACE FIRST—Wednesday's docking of Gemini VIII spacecraft should have looked something like the above artist's concept. At any rate, it will have to be assumed

that this was the scene 160 nm above the earth until on-board photos of the rendezvous and docking are brought back to Houston after recovery.

Gemini Frog Egg Experiment Checks Zero-G Cell Growth

An experiment designed to study the effect of weightlessness on living cells is aboard the Gemini VIII spacecraft.

The experiment, using newly-fertilized frog eggs of the species *Rana Pipiens*, was designed by Dr. Richard S. Young, Chief of the Exobiology Division at NASA's Ames Research Center.

The experiment, designated S-3, may help to find out if long periods of weightlessness during long space trips would have effects on the cells of individual space travelers.

Frog eggs were chosen because they appear to require gravity for normal development, and effects of zero gravity should be easy to identify.

Scientists so far have not found any obvious short term effects of weightlessness on living organisms. This has been determined tentatively by the prolonged manned flights of the Gemini program, and other flights.

However, the question of whether there are subtle long-term effects of weightlessness at the cell level has not been answered, according to Dr. Young. Also, such experiments may provide information as to the relationship between gravity and basic cellular processes.

A suggestion of possible long-term effects of weightlessness at the cell level came from an experiment on the Gemini V flight. That flight carried an experiment by Dr. Michael Bender, Oak Ridge National Laboratories, which measured effects of a known radiation source on human blood cells. There appeared to be subtle differences in effects on the cells which were radiated in weightlessness, and those in the control group which were radiated on the ground.

In the frog egg experiment, Dr. Young will be looking for abnormalities in cell structure, changes in chromosomes, effects of weightlessness on cell division, and gross effects on em-

bryos developing from fertilized eggs.

Frog eggs were chosen because biologists have been studying them for 100 years, and because they appear to be gravity-dependent.

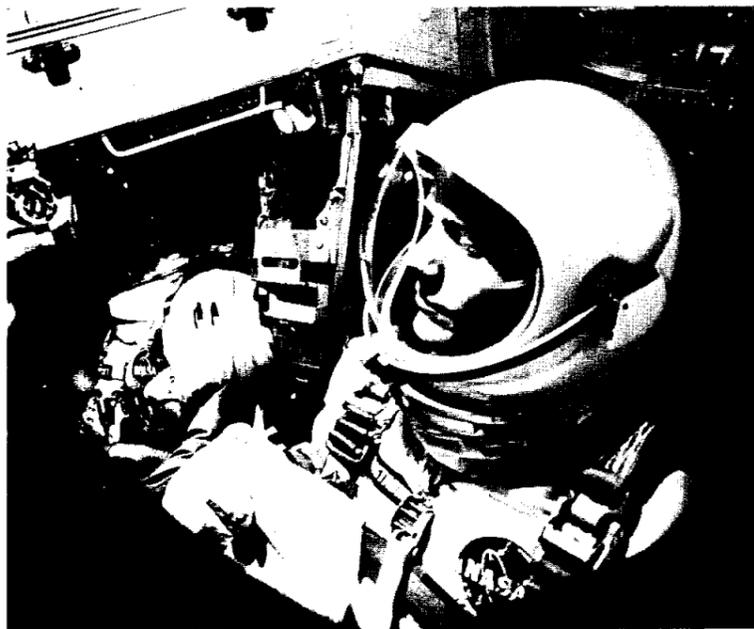
A German biologist, Otto Schultze, determined this in a classic experiment in the 1880's. Frog eggs have a heavy end which is always down after fertilization. Schultze turned a frog egg over and resulting frogs had two heads.

Other abnormal orientations of frog eggs have produced various abnormalities. However, it has never been certain that these effects are not the result of pressure required to hold the egg upside down. Study of eggs in weightlessness, where there is no down and no orientation to gravity, may settle this.

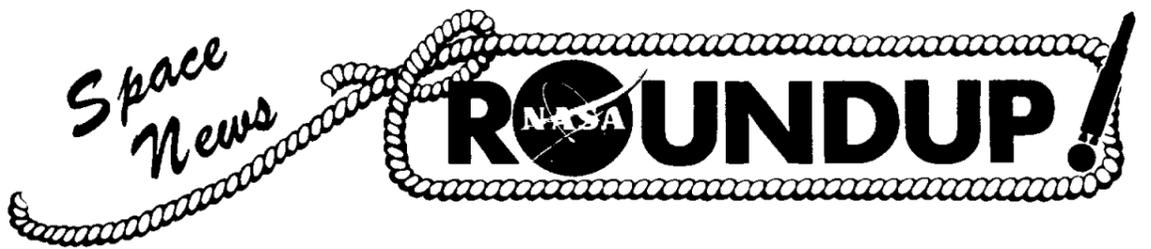
Furthermore, since frog eggs probably are gravity-dependent, they may be sensitive indicators of weightlessness effects.

For example, researchers will look for changes in mitotic spindles (part of the cell division apparatus), and for abnormalities when the cells begin to differentiate to from specialized

(Continued on page 2)



EAGER CREW—Gemini VIII crewmen Neil Armstrong and David Scott run through a pre-launch cockpit checklist during a simultaneous launch countdown demonstration at Launch Complex 19 last week.



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Post-Docking Troubles Force Early Landing of Gemini VIII

Onset of unexplained yaw and roll motions in the Gemini VIII/Agena combination shortly after successful docking Wednesday prompted the crew to undock. Use of the Re-entry Control System thrusters were required to stabilize the Gemini. Mission rules call for landing in the next suitable landing area when the RCS rings have been activated.

Gemini VIII retrofired normally and reentered in recovery area 7-3 in the Western Pacific where the destroyer USS *Mason* picked up the crew and the spacecraft at 12:38 am CST yesterday.

Landing was approximately

10 hours 40 minutes after lift-off, in the seventh revolution.

A clear, balmy day at Kennedy Space Center, two perfect launches, and the chase was on. Gemini VIII with crewmen Neil Armstrong and David Scott aboard roared spaceward Wednesday after a no-holds countdown to overtake and dock with the Agena rendezvous vehicle that preceded them into orbit 101 minutes earlier.

Gemini VIII liftoff was at 10:41:02 CST, and all Gemini Launch Vehicle events took place as programmed. The spacecraft was inserted into an orbit with a 87 nm perigee and a 147 nm apogee. Nominal desired ephemeris was 87/146 nm.

Mission Control gave the Gemini VIII crew a green light for an "M=4" rendezvous with the Agena—after fourth spacecraft apogee.

Launch of the Agena rendezvous vehicle Wednesday was precisely on schedule, with liftoff at three seconds after 9 am CST.

The Atlas Standard Launch Vehicle which boosted the Agena into orbit performed normally with all events occurring as programmed. Separation of the Agena and shroud jettison telemetry signals were received in Mission Control on schedule, and the insertion burns of the Agena secondary and primary propulsion systems were nominal.

Post-insertion tracking from the Canary Islands station gave

flight controllers in Mission Control confirmation that the Agena had been inserted into a 161 nm circular orbit—exactly the ephemeris that was desired for rendezvous.

Complete coverage of the Gemini VIII mission will appear in the April 1 *Roundup*.

In Gemini VIII pre-launch preparations, Spacecraft VIII was mechanically mated to the launch vehicle March 4. Agena 5003 was mated to the Standard Atlas Launch Vehicle March 1.

Phase two of qualification tests of the modifications to the Agena primary propulsion system was completed the first week in March at the Air Force Arnold Engineering Center, Tullahoma, Tenn. The final run of Phase II, or Mission simulation phase, was a burn of 180 seconds.

Duration of other burns in Phase II ranged down to 15 seconds at chamber altitudes ranging from 350,000 to 360,000 feet. Propellant temperatures in the tests ranged from 10° to 100° F. Completion of Phase II gave a green light to choice of the Agena as a target vehicle for the Gemini VIII mission.

The last 14 in a series of Phase I ignition tests of the Agena engine were completed at Tullahoma prior to the start of Phase II. Except for the first two runs, which were at 260,000 feet chamber altitude, all the Phase I runs were at 360,000 feet. Eight of the tests were with propellant temperatures of 30° and six were at 10° F.

Science Advisory Committee Formed To Study Future Space Projects

A temporary Science Advisory Committee to advise NASA on the conduct of future space projects has been announced by NASA Administrator James E. Webb.

Webb said the new Committee is being formed because in the next generation of space projects, NASA will need new policies and procedures and possibly new organizational arrangements to enable scientists to participate.

The Committee will be chaired by Dr. Norman F. Ramsey, a Harvard University physicist. Members will be distinguished astronomers, biologists, physicists, and geologists from eight universities.

The groups will work directly with Dr. Homer E. Newell, NASA Associate Administrator for Space Science and Applications.

Dr. Newell emphasized, however, that the Committee will study the conduct of future space projects on a NASA-wide basis including manned and unmanned flight programs.

The Committee will study

how best to conduct such programs as the Voyager planetary spacecraft including the automated biological laboratory, the post-Apollo lunar exploration program, and National Space Astronomy Observatories — a project recommended by astronomers in which 120-inch telescopes would be orbited for space astronomy. These are projects which have been recommended by the Space Science Board of the National Academy of Sciences.

Dr. Newell said that in the case of many of these projects, the package of scientific instruments would in essence be laboratories for scientific experimentation rather than a collection of individual scientific experiments.

"The most competent astronomers, biologists and physicists in the nation must be deeply involved in the conception, design, fabrication and testing of the equipment involved for six to eight years prior to launch," he said.

Dr. Newell said typical tasks of the Advisory Committee will

be to review the resources of NASA and other institutions to support such projects and advise NASA on:

—How to organize them to enable the most competent scientists and engineers to participate;

—What steps should be taken both inside and outside NASA to assure that proper people will be available to manage these projects;

—What system should be used to select the scientific investigations to be conducted;

—And whether the orientation of some NASA field centers should be changed to support these projects.

In addition to Chairman Ramsey, other members are: Dr. George W. Beadle, University of Chicago; Dr. Leo Goldberg, Harvard University; Dr. Jesse L. Greenstein, California Institute of Technology; Dr. Harry H. Hess, Princeton University; Dr. Howard Johnson, Massachusetts Institute of Technology; Dr. Gordon J. F. MacDonald, University of California at Los Angeles; Dr. Horace W. Magous, Dean, UCLA's Graduate School; Dr. Nicholas U. Mayall, Kitt Peak National Observatory, Tucson, Arizona; Dr. Colin S. Pittendrigh, Princeton University; Dr. Martin Schwarzschild, Princeton University; Dr. Charles Townes, Provost, MIT; Dr. James A. Van Allen, State University of Iowa, Iowa City.

Space Voyager Recounts Solitary Flight To Mars

(The Roundup hardly ever runs first-person articles, but the following account written by Peter Smetek of Technical Services Division seemed to be of some merit. Editor)

My Martians

Last night the United States launched another space vehicle with the intention of landing on and exploring the planet Mars. I am the spaceman aboard that vehicle. My spaceship is fully equipped to bring back samples of the minerals that are present on Mars. Mars cannot support life, according to all scientific calculations, so consequently, I have no preconceived notions about any little green men greeting me upon arrival.

After launch I set my course on the stars Vega and Sirius, and tuned the automatic detection equipment to home in on the emissions from Mars. With all necessary assignments completed, I then placed myself in suspended animation.

The next thing I experienced was the rude electrical shock from the spacetime clock jolting me awake from my state of deep sleep. Suddenly, I was conscious of a vast new world that enveloped my spaceship. Mars was apparently devoid of everything but space. Then I caught sight of what appeared to be a group of dust eddies blowing in the direction of my ship. As they came closer, I noted they had definite sizes and shapes. They emitted a strange translucent glow somewhat pinkish in color which compared to the same general color of everything on Mars. The shapes were formed by two cones placed base to base (◀▶). Motion and stabilization appeared to be provided by their rapid spinning about their axes, much like a gyro.

The shapes came directly to my vehicle and surrounded it. Then fear struck my heart. The hackles on my neck stood at rigid attention! My every action was being closely observed.

To add to my distress, my transceiver crackled with strange

discordant noises. Thinking it might be a transmission from Earth, I sent out a lengthy call informing Earth of my strange visitors. Instantly, I was answered in precise English, and there could be no doubt it was my spinning gyro creatures who were speaking. They assured me that I had nothing to fear. As intelligent beings they could speak my language or utilize any or all forms of communication. For that matter, they could read my very thoughts!

All of their capabilities were electromagnetic in nature. Since my thinking was conveyed by electronic impulses, it gave them easy access to my thoughts. They were speaking over my transceiver only to accommodate me. Their intelligence appeared to be infinite. They knew all about Earth and even my individual life.

To these creatures our so-called advanced technology was still in the Stone Age. To my finite mind, they carefully explained how they were created by nuclear energy from the sun reacting to the minerals of Mars. Their growth was predicated on movement and intense heat, similar to the technique we use to grow germanium crystals. Finally, they demonstrated the reproduction action. I was awed by the intense light and the results. I bubbled with admiration!

"Will you stop making so much noise!" The bedroom light blinded me, and my wife was shaking me awake.

Was this a dream? Impossible! It was much too real. I must find out. Tonight I will launch another space probe. If need be, I will sacrifice my life for science. I intend to use the same potent rocket fuel: one peanut-butter and jelly sandwich followed by two dill pickles.

Winning Cage Teams



AMERICAN DIVISION CHAMPS—The Mission Planning and Analysis Division "Gunners" basketball team show off their trophies for having won the American Division championship in the MSC/Ellington AFB Basketball League. The Gunners won eight games and lost none. Front row, left to right, are: Bob Regelbrugge, Richard Cruse and Dana Beatman. Second row; Bob Pierce, Ken Young and Charles Jones. Third row: Kelly McDonough, Larry Armstrong and Gene Ricks.



NATIONAL DIVISION CHAMPS—Winners in the National Division of the MSC/Ellington AFB Basketball League was the IBM team, winning eight and losing none in League play. Front row, left to right, are: Pete Pampelina, Tom Hickey, and Doyle Goodale. Second row: Carl Roth, Merritt Jones, Terry Anderson and Dick Fitzgerald.

Frog Eggs

(Continued from page 1)

organs such as eyes and limbs.

The experiment has wide potential significance since all living cells are similar. All cells have protein, lipids, membranes, the DNA genetic code, and similar fundamental components.

Familiar gravity effects, such as liquid flow, thermal convection, and sedimentation rates, operate within single cells. In theory, these physical effects would occur inside cells over ten microns in size. Frog eggs are well above this size.

For the Gemini VIII experiment, cells were fertilized and placed in four plastic chambers about four hours before launch. The astronauts arrested cell growth at intervals by turning handles which inject formalin into the chambers.

In one chamber, growth was arrested 15 minutes before launch before the cells have divided once. Growth in the second chamber was stopped at three-and-a-half hours after launch, after one or two cell divisions. In the third chamber, astronauts stopped growth at about 27 hours after launch, when the dividing eggs have begun to resemble tadpoles. Eggs in the fourth chamber will be returned alive, and, it is hoped, can be kept alive through the tadpole stage.

Dodge City Bedside Manner



MEDICARE—"Golly Bill, you ol' scutter. Why don't you let Doc Berry give me a proper examination? At least he ain't a horse doctor like you!" Dr. Charles A. Berry, Chief MSC Medical Programs, and Doc Adams (Milburn Stone) seem to be stumped in their diagnosis of Festus Hagan's (Ken Curtis) ailments as they listen for signs of life. Festus and Doc of television's "Gunsmoke" visited MSC during the Gemini Mid-Program Conference.



SATIRE AND CRITICISM IN BLACK AND WHITE—Helen Newton shows off a few of the 260 original political and editorial cartoons in her collection. The idea for collecting cartoons came by accident when she asked a political cartoonist to autograph for her a banquet program upon which he had been doodling.

Helen Newton's Unique Hobby Is Collecting Cartoon Originals

While some people collect stamps, sea shells, antique automobiles or Civil War Minié balls, Helen Newton of the Supply Branch of Administrative Services collects something a little more unique—original political cartoons.

It all started when Pulitzer-Prize winning editorial cartoonist Tom Little of the Nashville *Tennessean* gave her the original art of one of his cartoons. From there on, it was a matter of Helen's persuasiveness in getting other cartoonists around the

Singleton Dance Party Planned for March 26

Ticket sales closed at noon yesterday for tonight's MSC Singleton Club hayride and wiener roast.

The Singleton Club's next function will be a dance featuring a live band March 26 at the Villa Monterrey, 9150 Gulf Freeway. The dance will run from 8:30 pm to 1 am.

Tickets, on sale through March 24, are available from Suzanne Thoben 4904, or from Mary Lopez 2761.

The Club's April meeting will be April 5 at 5:30 pm in Bldg. 336, Ellington AFB. A social hour will follow at the Blue Room of the Ellington AFB Officers' Club.

country to part with original cartoons. Today, her collection totals 260 original editorial/political cartoons.

Among the cartoonists represented in her collection are Tom Little, Nashville *Tennessean*, Vaughn Shoemaker, New York *Herald Tribune*, Bruce Shanks, Buffalo, N.Y. *Evening News*, and Reg Manning, syndicated in western US newspapers. From England, Helen has several original cartoons by Chrys of the London *Daily Mail* which are done in blue and black instead of black and white, and which contain more than the average detail.

Helen has exhibited her cartoon collection at several art shows and on several television broadcasts.

Her first exhibit was at the May Art Festival at Bethel College, McKenzie, Tenn. Next came an exhibit at the University of Georgia Art Museum and at the Continuing Education Building. Other showings included the University of Corpus Christi, the University of Arizona and the University of Houston M.D. Anderson Library.

Helen's television appearance include stations in Atlanta and Macon, Ga., Corpus Christi, the Ames Brothers Show on Channel 13, Houston, and recently on Channel 11's Joanne King Show.

'Little Squirt' Aids Landing Group In Apollo Soft-Landing Development

A "little squirt" goes a long way toward solving Apollo landing rocket problems being investigated by engineers of MSC's Landing Technology Branch.

The "squirt" is a burst of nitrogen gas which is fired through four nozzles in the bottom of a one-eighth scale Apollo command module spacecraft. The nitrogen bursts simulate full-scale solid-fuel rockets, being developed for possible use in Apollo water landings to slow the rate of descent for a softer landing. They would be fired when the spacecraft is a few feet above the water.

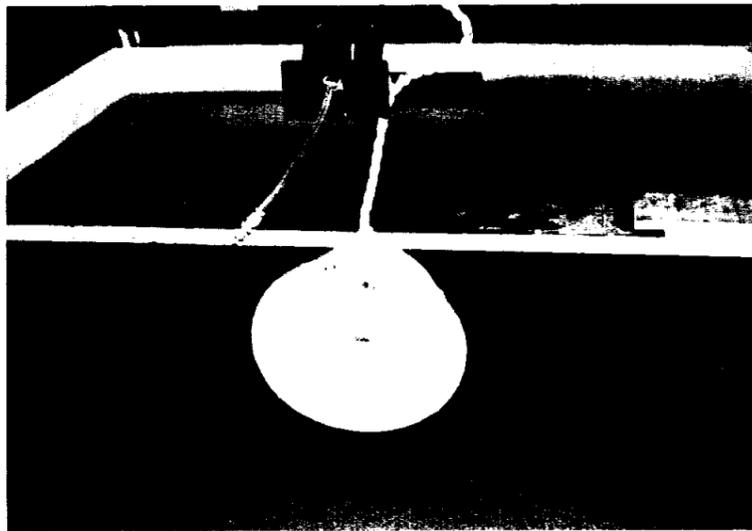
The 30-pound model is dropped into a 9,000-gallon water tank in the Structures and Mechanics Division laboratory. When the model is a few inches from the water, the rockets are fired, simulating in miniature the ignition of rocket engines on an Apollo spacecraft.

Since the gas is fired in a one-tenth of a second burst, the engineers have christened their model "Little Squirt." It is an economical method of conducting a complex test program, since hundreds of test firings with the model can be made in less time than it takes to conduct a full scale drop with a five-ton vehicle.

The engineers are interested in two effects the rocket motor firing creates which helps the spacecraft landing.

Aeration is produced by the rocket plumes impinging on the water. Its effect is to make the water less dense under the spacecraft. Ground effect is the recoil of water and gas against the spacecraft. Like a vertical column of water in a fountain the ground effect holds the spacecraft above the main body of water and then lowers it gently as the column subsides.

Both these effects are being studied in vertical drops. Pressures and accelerations are measured on 14 channels of data from onboard instrumentation. In future tests, the "Little Squirt" will be given horizontal velocity by swinging it from a boom attachment into the water to simulate landing in a brisk wind.



Bombs, er . . . Spacecraft away!



Miniature rockets brake spacecraft.



Splush! Nitrogen squirt aerates water and produces 'ground effect' for softer landing.

Civil Service Commission To Lead Equal Opportunity 'Positive Program'

President Johnson has made the Civil Service Commission responsible for the Federal Equal Employment Opportunity program with the mission of making Government a showcase of equal opportunity and a model for other employers.

In issuing Executive Order 11246, the President abolished the President's Committee on Equal Employment Opportunity, which had coordinated the program to abolish discrimination based on race, creed, color, or national origin, and placed the Federal employment part of the program under CSC. The change was one of a number approved by the President on the recommendation of Vice President Humphrey for a realignment of civil rights responsibilities among Federal agencies.

The new order directs agency heads to establish and maintain a "positive pro-

gram" of equal opportunity for all Federal employees and applicants for Federal jobs and vests CSC with responsibility of providing leadership and reviewing progress in this area.

CSC is directed to set up procedures for "prompt, fair, and impartial consideration" of all complaints of discrimination in Federal hirings and promotions. The rules will include at least one review within the agency involved and a final appeal to CSC.

Labor Department has assumed responsibility for the other functions previously coordinated by the former committee.

"The main goal of America in this decade is the fulfillment of human rights," said CSC Chairman John W. Macy, Jr. "And after more than 20 years the leadership for nondiscrimina-

tion and equal opportunity in Government employment has shifted from a succession of Presidential committees to the Commission."

President Johnson described the milestone when he said, "It is not enough just to open the gates of opportunity. All of our citizens must have the ability to walk through those gates.

"This is the next and most profound stage of the battle for civil rights—not just equality as a right and a theory, but equality as a fact and as a result."

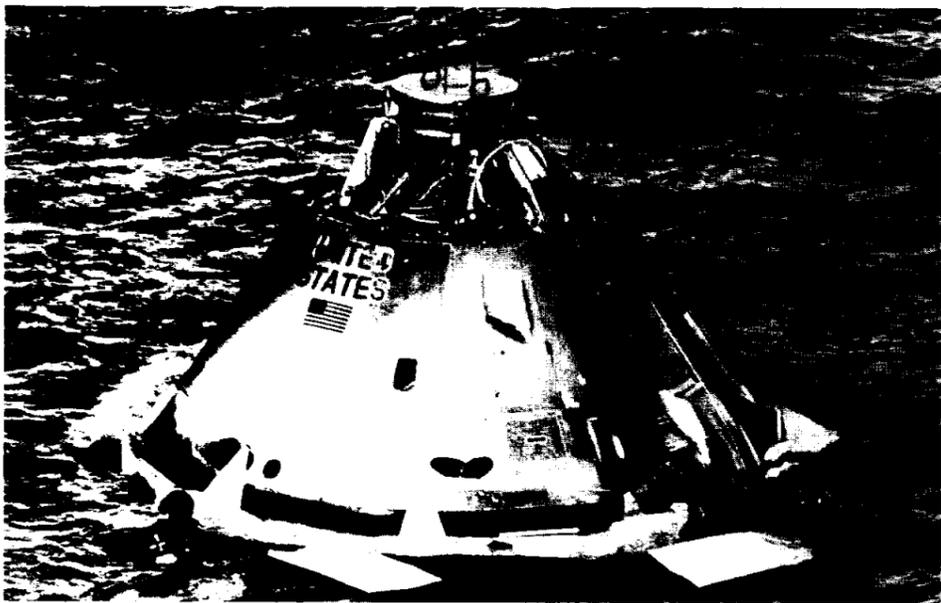
Thus the goal is equal results, said Mr. Macy. "And the milestone is the need to move beyond opportunity—beyond the opening of the door. We need to insure the achievement, not just the promise, of equal employment opportunity for all Americans."

Although achievements of Negroes and other minority groups during the past four years have been impressive, Chairman Macy said, "the need is for leadership and supervision through a nationwide organization, for motivation and guidance and inspection of personnel processes in the field service where the great majority of the Federal work force is and—probably most important of all—the need is for re-thinking and re-directing our traditional concepts of merit-employment toward the challenge of equal rights."

Mr. Macy outlined the basic directions of Government's effort and the approach to carry it out: (1) a renewed attack on prejudice itself—with the goal of eradicating every vestige from the Federal service; (2) a painstaking reappraisal of Government's job structure and employment practices—with the goal of pro-

viding entrance and advancement opportunities that fulfill the fair expectation of more of the economically and educationally disadvantaged; (3) a new emphasis on training and upgrading employees already on the rolls—with the goal of removing from the system any feature that discriminates against full participation by minority employees.

He also called for (4) community involvement in which Government participates with other employees, schools, and other public and private groups in cooperative action to improve employment opportunities for minority groups and other disadvantaged citizens; and (5) new approaches in the administration of the program, including new positive-action regulations, a positive program headed by each agency head, and a new management information system.



'STABLE-ONE' POSITION — Swimmers attach the floatation collar to the Apollo 201 command module. The upper deck which houses the landing system is exposed following post-reentry jettison of the apex heatshield. An extra bonus of the mission was recovery of the apex cover.



SUNDOWN RENDEZVOUS — Helicopters hover over the Apollo 201 command module as the USS Boxer steams alongside at dusk to recover the spacecraft. The Boxer arrived at Norfolk, Va. March 6, from where the spacecraft was flown to NAA-Downey for analysis.

Quick-Look Data Shows Apollo 201 Meets Primary Mission Objectives

All test objectives of the first unmanned Apollo Saturn IB mission February 26 were achieved, according to preliminary information. Saturn/Apollo 201 was the first flight test of a production Apollo spacecraft and Saturn IB launch vehicle.

All aspects of the two stage launch vehicle performance were within the expected range.

The sequence of events scheduled for the spacecraft occurred essentially as planned. The command module was recovered with no evidence of structural damage. There was no significant damage to the ablative heat shield other than expected charring. The surface was smooth and no excessive erosion was noted. Windows were in good shape, though one was fogged and the spacecraft interior was essentially dry.

Launched at 10:12 a.m. CST, first stage Saturn IB performance was normal. The four inboard engines cut off at 141.4 seconds

after liftoff, about .9 second later than predicted. Outboard engine cutoff came at 146.9, about .4 second later than expected.

The second stage S-IVB ignited at 149.3 seconds, .4 second later than predicted, and cut off at 602.7, 10 seconds later than expected. This longer burning time was attributed to actual average thrust being about 2% below that predicted. However, both thrust and time deviations were within expected tolerances. The guidance system automatically compensated for the lower thrust by extending burning time to achieve the desired results.

The guidance and control system performed well: both S-IB and IV-B trajectories and end velocities were normal, and no structural problems were found in either of the stages or the instrument unit. The quality of data received at ground stations was good and very few losses

occurred in the expected 1,300 measurements telemetered.

One of the two cameras carried aboard the first stage and ejected following burnout was recovered by Air Force crews. The cameras had excellent coverage of stage separation and S-IVB ignition. The parachutes on the cameras did not function properly, however.

The spacecraft service module main propulsion engine performed a little below normal because of an unexplained drop in oxidizer pressure. This resulted in a reentry speed some 500 miles per hour less than 18,500 miles per hour expected but adequate to evaluate performance of the spacecraft heatshield for earth orbital missions.

Preliminary data indicates a 7% reduction in heat rate and about 10% less surface temperature on the heat shield.

The service module engine burned normally at the start of the first firing and then a slight decrease was noted. Pressures were back to normal at the end of the second firing of the engine. Engine performance was normal under the lower oxidizer pressure condition. A careful study of data is expected to provide an explanation of the pressure drop.

The earth landing system functioned properly.

After impact, however, one of the two main parachute disconnects failed to fire and the parachutes remained attached to the spacecraft until recovery swimmers cut them free. The unfired parachute disconnect will be examined to find the cause of the misfire. The spacecraft uprighting system was not activated since the spacecraft landed upright in the water in the "Stable I" position.

Helicopters and swimmers were at the spacecraft about 33 minutes after splashdown. It was retrieved by the USS Boxer at 1:13 p.m. CST, about 3 hours after liftoff. The ship arrived at Norfolk, Virginia, on March 6.

The spacecraft was flown to Downey, California for detailed inspection by NASA and North American Aviation Apollo program engineers.



ONCE OVER EASY — A slightly scorched Apollo 201 command module is lowered gently into a cradle aboard the USS Boxer after it was hoisted from the Atlantic west of Ascension Island at dusk February 26.

GASP*

*Which means, naturally,
Galloping Acronyms Save Paper.

(Reprinted courtesy Douglas Aircraft Company's quarterly, *Douglas Progress*.)

A British writer, tongue planted firmly in cheek, recently offered a new "service" to the aerospace industry: "IDIOTIC ACRONYMS, Ltd."

His purpose was to focus critical light on those engaged in inventing new acronyms, a busy field these days.

An acronym, of course, is a synthetic word generally composed of the first initials of the words in a phrase or title. It saves times, and words.

For example, there is an office which oversees U.S. aid to foreign countries. You could easily devise a complex name for it, but as a timesaver it's simply called AID, for Agency for International Development.

CARE is another case in point. Most people know it's a privately financed organization to help the needy abroad; few know that the initials stand for Co-operative for American Relief Everywhere.

While acronyms have their place, there are some who contend that too often the name of an organization, a project, or a program is elaborately tailored to result in what might seem to be a clever acronym.

In the case of the British magazine, *FLIGHT International*, it was the acronym BOADICEA that agitated the pen of writer Roger Bacon. If you studied British history, you may recall that Boadicea was the queen of a British tribe that revolted against the Romans. Now the name has been applied to a \$10 million computer of the British Overseas Airways Corporation.

In the 10th Century context, according to Mr. Bacon, BOADICEA stands for British Overseas Airways Digital Information Computer for Electronic Automation.

Now, lest this reference be taken as a reflection on the British, it should be pointed out that if anyone dominates in the field of acronym production, it is this country. And in particular, its aerospace industry.

There is CLAM, a Chemical Low Altitude Missile. And ASH and DASH for Assault Support Helicopter and Destroyer Anti-Aubmarine Helicopter. We have HADES for Hypersonic Air Data Entry System, and ACRE for Automatic Check-out and Readiness Equipment.

Then there's PLATO for Programmed Logic for Automated Learning Operation. OARS for Ocean Area Reconnaissance Satellite, ROOST (a Douglas contribution) for Reusable One-stage Orbital Space Truck, and IRIS for NASA's Infra-Red Interferometer Spectrometer.

These are relatively simple acronyms; some are more contrived. Take CHAMPION, which stands for Compatible Hardware And Milestone Program for Integrating Organizational Needs. And RAMPART for Radar Advanced Measurements Program for Analysis of Re-entry Techniques. And TOMCAT, which represents Theater of Operations Missile Continuous-wave Anti-Tank Weapon.

CHAP, ASSET, ARM, TOW, BAMBI, FIRST and FLIP—all are acronyms, as are AMOS, ANNA, DIANE, IGOR, RITA, ROSIE, SADIE, SARAH and even SOLOMON.

In fact, the field is getting so crowded that one company, Raytheon, puts out an annual dictionary of acronyms and abbreviations (from which many of the above examples were taken). The publication is called "ABRACADABRA," which stands for Abbreviations and Related Acronyms Associated With Defense, Astronautics, Business and Radio-electronics.

Oh yes, *FLIGHT International's* new service, "IDIOTIC ACRONYMS," is an acronym itself. It stands for Integrated Device for Imprisoning Or Thumping Inane and Childish Adults Who Continue Relentlessly to Organize Names Yielding Meretricious Spontaneity."

S-IC Contract Switched To Cost-Plus-Incentive

NASA has assigned to The Boeing Co., New Orleans, a supplemental agreement converting the company's Saturn V first stage (S-IC) contract from a fixed fee to an incentive fee contract. It is the first contract involving a rocket stage to be converted to an incentive type in the Saturn program.

The modification covers the conversion of the first of three "schedules" currently under the Boeing contract for the S-IC stage. NASA's Marshall Space Flight Center, Huntsville, Ala., manages the contract.

Under Schedule 1, Boeing is responsible for the manufacture, assembly, and test of two S-IC ground test stages and eight flight stages, in addition to supplying major components for two S-IC test stages and two flight stages assembled at the Marshall center.

Work under Schedule 1 is being performed at NASA Michoud Facility, New Orleans; Mississippi Test Facility, Han-

cock County, Miss., and Boeing's Wichita, Kan., facility.

Schedule 2, being performed at Marshall, calls for Boeing to provide systems engineering and integration support in development of the three stage Saturn V space vehicle, while Schedule 3 directs the contractor to provide Saturn V launch support at NASA's Kennedy Space Center, Fla.

This incentive fee contract modification which has been in practice since July 1, 1965, will continue in force through Oct. 30, 1969. Incentive fee contracts differ from fixed fee in that a contractor's fee is based largely on an evaluation of his performance, rather than on a fixed, negotiated sum.

In practice, a firm operating under a cost plus incentive fee agreement will be graded on the basis of its ability to (1) perform assigned tasks satisfactorily; (2) operate within prescribed costs; and (3) meet established schedules.

This Boeing Saturn V contract is valued at \$850,114,303. Not reflected in this figure is work to be performed under Schedules 2 and 3, which will be negotiated separately.

Security Lists Large Collection Of Lost/Found

A wide assortment of lost/ found personal belongings has been accumulated by the Security Branch.

The list runs the gamut from cameras to Social Security cards: one Satellite II camera, a GE exposure meter, a lady's Bulova watch, a man's Timex watch, three high school class rings, and James Gilbert Froeschner's Social Security card.

Also in the collection are several single gloves, a dozen pair of sunshades and spectacles, several sets of keys, several scarves, one imitation pearl necklace, a boy's wallet, a tie clasp, one pair of nail clippers, a child's sweater, one pair of sandals, a check register and a draftsman's compass.

Employees who believe any of these articles are theirs may identify them at the Security Branch on the ground floor of Building 2, or call Paul Krieger, Ext. 3331.

Security Alters Badging Scheme To Cut Waiting

Security Branch has streamlined its badging procedures for new employees so that there should be fewer long lines to sweat out in getting car decals and badges issued.

Mondays are now set aside for badging of new MSC employees in Room 157, Bldg. 2. Tuesdays through Friday noon are for badging new contractor employees and for badge changes for MSC and contractor employees. Terminations will be processed on Friday afternoons.

New contractor employees reporting for work on Monday may obtain a temporary visitor's badge at any receptionist point or at Visitor Control in Bldg. 100.

Beginning April 4 additional or replacement car decals will be available in Bldg. 100, but new employees will still be issued decals when they are processed through the badging room. Employees are reminded to scrape off decals prior to trading in a car.

Contractor companies having a large number of employees who require badging or badge changes may expedite the badging by contacting the Security Branch in advance. Badge room Security employees will continue the fingerprinting service for contractor employees as a courtesy, but may temporarily discontinue the service when waiting lines get too long.

Personal projects for employees will not be done in the Badge Room, such as laminating cards, passport photos or kiddie pictures.

Civic Music Tickets Offered Thru March 23

Memberships in the Houston Civic Music Association's 1966-67 season are available in a limited number. The season fee for the series of six musical presentations is \$7.50 a person.

The membership campaign opened March 16 and ends March 23. Further information is available from Grace Winn 3366, Doris Reid 3011, Marv Matthews 7365, Dick Wieland 3021 or Merv Hughes 3761.

Divot Diggers Open 1966 Golf Season

The MSC Golf Association will open the 1966 hook-and-slice season tomorrow with an elimination Two Man Team "best-ball" Championship which will end in early May. Monthly one-day tournaments are planned.

An individual Match Play Championship will follow in July. Also beginning tomorrow is an individual Medal Play Championship running through the middle of November.

Ray Walker and Lou Leopold tied with net 73's in the February 22 Brock Park Tournament. Max Engert, Charles Davis and Ed Barker tied for third with net scores of 78.

Golfers and/or duffers interested in joining the MSC Golf Association should contact Dave Rosen, Ext. 4916.



SPACE POSTAGE—Postage stamps commemorating man's achievements in spaceflight are the specialty of Ed Olling's stamp collection. Olling, chief of the Space Station Office of the Advanced Spacecraft Technology Division, has three books full of spaceflight stamps and covers. He also collects other science-related stamps.

Olling Mixes Work and Hobby: Collects Spaceflight Stamps

Spaceflight on postage stamps is a doubly interesting subject for Ed Olling, Chief of the Space Station office in Advanced Spacecraft Technology Division.

Collecting stamps which depict spaceflight accomplishments has been a hobby for Olling since the first issue by the Soviet Union commemorating the launch of Sputnik I in 1957.

The current and projected spacecraft of the Soviet Union are rather well illustrated by their stamps, according to Olling. The engraved stamps bring out many details which are not mentioned in the available literature.

Olling, who has three books full of spaceflight stamps, also collects other science related stamps, showing astronomy, nuclear energy, space communications, and meteorology.

Almost every country in the world has issued stamps commemorating spaceflight. Most of them honor the flights of the astronauts of the U.S. and cosmonauts of the Soviet Union. Some countries, such as Great Britain, France, Italy, and Canada have stamps for their own satellite launches.

The United States has only issued three stamps relating to spaceflight. The first stamp was for the Echo communications

satellite. A second stamp was issued for the first manned orbital flight in the Mercury program, piloted by Lt. Col. John H. Glenn in 1962.

A third stamp honored the late Dr. Robert Goddard, whose pioneer work in liquid fuel rockets paved the way for U.S. space program.

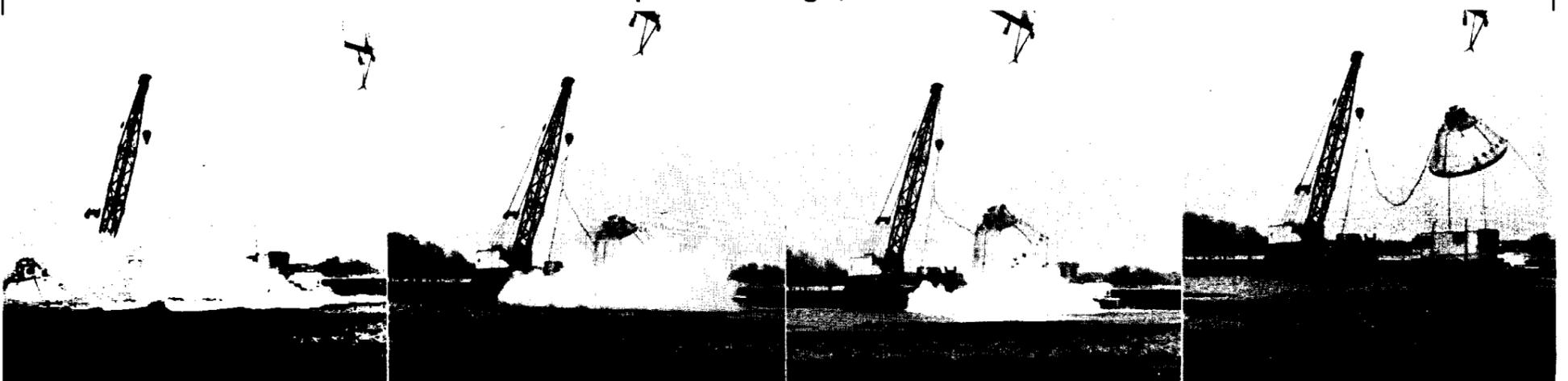
Musician(?) Gives Impatient Driver Brassy Raspberry

Traffic in the right-hand lane of NASA Road 1 was heavy approaching the cut-off to the Gulf Freeway just west of Webster. The MSC employee swung past the line of cars and pulled back into the right lane to exit to the Freeway.

The driver of the next car back, who stayed on NASA 1 toward Friendswood, thought he'd been cut out of the pattern. Accelerating up alongside the car turning off, the driver hoisted a trombone from the seat beside him and let fly a brassy "Blaaatt" toward the other driver, who almost lost control of his car as he convulsed with laughter.

Obvious moral: Beware of cutting musicians out of the traffic pattern; the next guy may play the tuba.

Apollo Swings, Man!



FIERY SOFT LANDING—The first test of landing rockets on an Apollo boilerplate with horizontal velocity was performed at MSC on March 2 by engineers of the Landing Technology Branch. The drop was made from a special swing rig which gave horizontal velocity

of 20 feet per second in addition to its vertical velocity of 30 feet per second. The drop simulated a landing in a brisk wind. Landing rockets are being investigated as a soft landing aid for the Apollo spacecraft.

The SPACE NEWS ROUNDUP, an official publication of the Manned Spacecraft Center, National Aeronautics and Space Administration, Houston, Texas, is published for MSC personnel by the Public Affairs Office.

Director Dr. Robert R. Gilruth
Public Affairs Officer Paul Haney
Editor Terry White
Staff Photographer A. "Pat" Patnesky

Spring — The Sap Riseth; Man Reapeth Backaches

*Spring has sprung,
The grass has riz.
I wonder where
Them flowers is.*

So much for poetry.

Sunday evening at 7:53 Houston time, an annual event will take place that most everyone looks forward to—the Vernal Equinox. That's the first day of Spring to you slobs who don't dig astronomical-type terms.

And with Spring the sap rises in both man and plant. Man emerges from his centrally-heated hibernation den and makes noises about fertilizing the yard, raking up winter's leaves, planting new trees and bushes, and other such exhausting good things. Break out the liniment.

After our recent rainy winter, it will be a treat to get out in the yard and soak up some sunshine—just as long as one doesn't get a sunstroke or severe sunburn in the process. Trying to lift a tree with its ball of roots and dirt with back muscles instead of leg muscles can lay one up with a painful back strain.

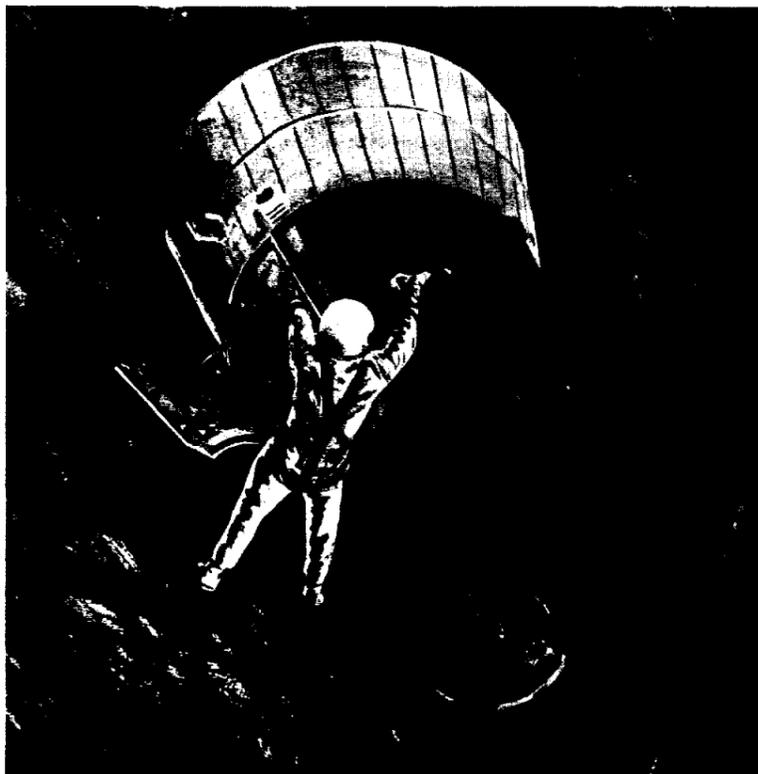
After all this ambitious fertilizing takes effect, man paradoxically must then haul out the lawn mower and cancel out all his earlier effort by shaving the face of his yard.

Harmless as it looks, the plain-old garden-variety lawn mower—especially the rotary-type—is a vertible missile launcher that kills, maims and blinds many adults and children in the country each year. When running the mower, keep small children in the house or in the opposite yard; wear heavy shoes, and police up nails, bits of wire, rocks and other potential projectiles beforehand.

While a lawn mower is a simple machine when compared to a car or to any of several common contraptions, here are some pointers on how to keep lawn mowers from becoming an amputation machine or a ballista:

- Never fuel tank while engine is running or hot.
- Place clutch in neutral and take firm stance when starting. Send other people away.
- Set mower height as recommended by manufacturer.
- Disconnect spark plug wire before when removing balled-up grass from mower blades.
- Walk uphill from mower on slopes so that a slip will not bring mower down on top of the jockey.
- Never leave running mower unattended.
- Never reach near running blades to pick up rocks or sticks.
- Treat the rotary lawn mower as the potential killer that it is; it can beautify as well as become a tool of destruction.

On The Lighter Side



Like for me to check under the hood?

OUT OF TEXAS' PAST

Sam Houston's Logic Told Him That His Was A Waiting Game

Newcomers to the Land of the Tejas are invariably surprised to find the oldtimers here celebrating two state holidays less than eight weeks apart, but you must remember that March 2 and April 21 were national holidays before they were state holidays. As we have seen, the Lone Star commonwealth declared herself independent in March and won the war for independence in April. Some MSC contract employees actually get free days on both dates, which shows you how seriously Texans still take tradition.

Since the battle that won the war was fought only a few miles north of Clear Lake, and since you will be seeing many a Texas tricolor unfurled to the Gulf breeze on April 21, you may as well bone up on the Battle of San Jacinto—which is pronounced exactly the way it looks and rhymes with pimento.

Actually, the fighting started on April 20, 1836. Sam Houston's mutinous little army of less than 800 angry and undisciplined men was camped near the confluence of Buffalo Bayou and the San Jacinto River, breakfasting on steaks from the Vince brothers' cattle, when Deef Smith galloped up.

Deef was a famous scout. His given name was Deef, not Deaf, and it was pronounced to rhyme with beef. He was a bit hard of hearing, but he had eagle's eyes. Anyway, Deef said Santa Anna had burned New Washington (Morgan's Point) and was marching toward Lynchburg with 1000 men.

And so he was. Sighting the Texas camp, the dictator opened fire with a 12-pounder. Joe Neill, commanding the Twin Sisters battery (donated by the ladies of Cincinnati), fired one of the famous lost fieldpieces for the very first time and scored a direct hit on the enemy gun, smashing its carriage and wounding an officer.

Houston then ordered Sid Sherman, commanding the

cavalry, to take 50 men and capture the crippled cannon. Sid tried but failed, losing two horses and getting two of his men wounded. So Houston bumped him to private and put Mirabeau Lamar in command of the cavalry. Lamar later became president and was Houston's bitter political opponent.

So ended the first day's action. By waiting until the next day to attack, Houston let the enemy bring up 500 reinforcements. Texans still like to debate whether Sam did this intentionally. The general always said he did. After the battle somebody asked him why he had waited until the enemy outnumbered him almost two to one before he attacked, and Houston replied: "Why make two bites of a cherry?"

Next morning Houston slept late and did nothing. Deef Smith brought news of the enemy reinforcements, and the soldiers cursed Houston and his no-win policy. But Houston took the scout out of hearing range from the camp and ordered him: "Take six men to do your listening for you, and take out that bridge over Vince's Bayou."

"But, general, that-ere bridge would come in mighty handy in case we had to make a run for Harrisburg," said Deef.

"I know that," said am Houston, mounting his big white stallion. "That's why I want it demolished, you boob!"

Remember that bit about Vince's Bridge. Because it plays an important part in the battle, which we'll tell you about in detail next issue.

Space News Of Five Years Ago

MAR. 20, 1961—Between this date and April 13, 1961 Phase III of the spacecraft airdrop program was conducted. Primary objectives of the drops were to study further the spacecraft suitability and floatation capability after water impact. Six drops were made, but later (April 24-28, 1961) the tests were extended for to additional drops to monitor hard-surface landing effects. In the water phase of the program, spacecraft components under particular scrutiny were the lower pressure bulkhead and its capability of withstanding heat shield recontact without impairing floatation capability. Helicopters were used to make the drops.

MAR. 23, 1961—Responding to inquiry by the chairman of the House Science and Astronautic Committee, President Kennedy stated in a letter: "It is not now nor has it ever been my intention to subordinate the activities of NASA to those of the Department of Defense . . . there are legitimate missions in space for which the military services should assume responsibility . . . and there are major missions, such as the scientific unmanned and manned exploration of space and the application of space technology to the conduct of peaceful activities, which should be carried forward by the civilian space agency."

MAR. 24, 1961—After analyzing launch-vehicle behavior in the Mercury-Redstone 1A and the Mercury-Redstone 2, officials at the Marshall Space Flight Center and the Space Task Group were of the opinion that there were a number of problems that needed to be corrected prior to the advent of manned flight. The problems to be resolved included jet-vane vibration, instrumentation compartment vibration, failure of the thrust controller system, and several other areas that needed attention. Many of these problems were studied by the personnel of

engineering activities and proposed solutions were formulated. It was felt, however, that flight was necessary to verify the corrections and the Mercury-Redstone Booster Development test was scheduled and flown. All test objectives were met; as a result of this test, the launch vehicle was man-raced for the planned suborbital flights.

MAR. 26, 1961—Pravda article stated that the day was "not far distant when a Soviet human being will rocket into space."

MAR. 28, 1961—President Kennedy requested Congress for \$2 million so that NASA could aid FAA in development of supersonic transport aircraft. President also asked for \$12 million increase in FAA budget.

MAR. 30, 1961—Redstone launch vehicle No. 7 was delivered to Cape Canaveral for the Mercury-Redstone 3 mission.

NASA-USAF-USN rocket research X-15 flown to 169,000 feet by Joseph A. Walker, NASA pilot, the highest altitude ever reached by man and which included 2 minutes of weightlessness at the top of his climb. The X-15, powered by XLR-99 engine designed to thrust it to 50 miles altitude and speeds of up to 4,000 miles per hour, was only run at three-quarters throttle.

MAR. 31, 1961—As of this date, all stations of NASA's world-wide Mercury tracking network were classed as being operational. An industrial team headed by the Western Electric Company turned over the \$60,000,000 global network to NASA in a formal ceremony later in the year.

Space Science Board of the National Academy of Sciences submitted its recommendation of February 10-11 that "scientific exploration of the Moon and planets should clearly be stated as the ultimate objective of the US space program for the foreseeable future."

Say 'Ahh,' Please

People who conjure up organizational charts, office code symbols and other such administrative flotsam and jetsam are not as humorless as one might imagine.

An MSC telephone directory user might scan through the directory a hundred times without noticing that the office symbol for Dr. Charles A. Berry's Center Medical Programs office is "AH."

Perhaps it was an accident, but more than likely the man assigning office symbols had his tongue depressor in his cheek.

Space News ROUNDUP!

MANNED SPACECRAFT CENTER, HOUSTON, TEXAS

EMPLOYEE NEWS

MSC BOWLING ROUNDUP

MSC 5 O'CLOCK MONDAY MIXED LEAGUE

Standings as of February 28

TEAM	WON	LOST
Pacesetters	53 1/2	30 1/2
Pot Shots	45 1/2	38 1/2
McH's	41	43
Thirds	37	47
Bombers	34	50

High Game Women: Tommie Bordeaux 194, Blanche Henderson 192.

High Game Men: E. Ray Walker 246, William Kutalek 228.

High Series Women: Gale Mauney 483, Sharon Brenan 482.

High Series Men: Harley Erickson 604, E. Ray Walker 590.

Handicap High Games Women: Blanche Henderson 259, Tommie Bordeaux 245.

Handicap High Games Men: Ray Kayfman 268, Ray Walker 263.

High Three Games Women: Sharon Brenan 647, Tommie Bordeaux 646.

High Three Games Men: Clyde Waters 664, Hal Erickson 655.

Bowlers improving averages by more than 10 pins this season: Charles Hurdle 15, Curley Darteze 11, Tommie Bordeaux 17, Sharon Brenan 13, Gale Mauney 10, Gloria Theologian 10, Ray Kaufman 12, Louise Tinner 33, Esther Hurdle 16, Pat Little 12, Ruby Henderson 12, Vernon Blanck 14, and William Kutalek 10.

MIMOSA MEN'S LEAGUE

Standings as of March 10

TEAM	WON	LOST
Whirlwinds	11	1
Chizzlers	10	2
Technics	8	4
Alley Oops	8	3
Agitators	5	7
Goobers	5	7
Foul Five	5	7
Green Giants	4	8
Fabricators	3	9
Road Runners	1	11

High Game: B. Graham 273, G. Amason 266.

High Series: G. Amason 701, B. Harris 701.

High Team Game: Whirlwinds 1108, Alley Oops 1105.

High Team Series: Chizzlers 3138, Technics 3108.

1966 MSC/Ellington AFB Volleyball League

American Division				National Division			
1. G&C	5. ASPO	9. 2578th	13. Coast Guard				
2. NAA	6. IBM (I)	10. FSD	14. FCD (I)				
3. CSD	7. FCD (II)	11. MPAD	15. IESD (B)				
4. IESD (A)	8. GE	12. Link	16. IBM (2)				

League games March 21-31: teams listed by numbers assigned above:

	March 21	March 22	March 23	March 24
6:30 pm	16 vs 14	10 vs 13	11 vs 12	9 vs 15
8:00 pm	3 vs 4	2 vs 5	8 vs 6	1 vs 7
	March 28	March 29	March 30	March 31
6:30 pm	6 vs 2	7 vs 8	4 vs 1	5 vs 3
8:00 pm	14 vs 10	15 vs 16	12 vs 9	13 vs 11

White Sands 1,000-lb. Beef Derby



WEIGHT WATCHERS—B. R. Gantz, Chief, Propulsion Engineering Office (PEO), sweeps the field in 1,000-pound beef derby by trimming off 45 pounds in a 75-day contest. Losers, Archie Beckett (left) and Mike Goduto (right) pay off as Bill Gantz (middle) weighs out in contest at 3:00 P.M., February 28th. Don Bronkema of the Program Control Office was not available when photograph was taken due to illness caused by Pernicious anemia, extreme low blood pressure, tired blood, and light-headedness.

Hans Brinkers, Junior Grade



OFFSPRING ON ICE—More than 400 youngsters and parents turned out for the February 27 MSC children's skating party at Winterland Ice Rink. At top left, skaters warm their ice-chilled backsides by the fireplace. The little girl at left center doesn't think she likes this skating jazz. At lower right, Joe Garino tries to convince 21-month old Joe "Tiger" Jr. that man-size skates prevent downfalls.

Roundup Starts Swap-Shop Section

Starting with the April 1 issue, the *Roundup* will accept MSC employee and on-site contractor classified advertising of items for sale, riders wanted and other types of personal, non-commercial ads.

Toastmasters To Form Breakfast Meet Group

The MSC Toastmaster Club is interested in forming a breakfast toastmasters group to meet at 7 am on the second and third Wednesdays of each month in addition to the regular first and third Wednesday dinner meetings at the Kings Inn.

Last Wednesday's Club meeting included the semi-annual election of officers, the names of whom will appear in the April 1 issue of the *Roundup*.

Ads should be as brief as possible and sent in writing to *Roundup* Editor, AP3. No ads will be accepted by telephone.

Deadline for ads in the April 1 *Roundup* is Friday, March 25. Deadlines for subsequent issues are the Fridays preceding dates of publication. Publication dates coincide with the Center's federal payroll check mailing every other Friday.

Ads should include name and home telephone number. The *Roundup* reserves the right to reject any ads that are in poor taste or which are commercial in nature, and to edit ads for brevity.

Softball Begins May 9

Team managers desiring to enter their teams in the 1966 MSC/Ellington AFB Softball League should call EAA Vice President-Athletics Dave Mullins by March 25. Mullins' extension is 4521.

Softball Begins May 9

Mullins said that a League meeting will be held in late March or early April to schedule league play to begin May 9.

Ads should include name and home telephone number. The

The Prince Visits Mission Control



ROYAL VISITOR—Prince Philip, Duke of Edinburgh and consort of Queen Elizabeth II of Great Britain, follows with interest Chris Kraff's explanation of the third-floor Mission Operations Control Room during the Prince's March 11 tour of MSC. Dr. Robert Gilruth, MSC Director, stands at left, and John Hodge, Chief of Flight Control Division and one of two flight directors for Gemini VIII stands at right. The Prince visited Mission Control during a Gemini VIII network simulation.

Faget Given Doctorate

Maxime A. Faget, MSC Assistant Director for Engineering and Development, yesterday was awarded an honorary doctorate in Engineering by the University of Pittsburgh.

The honorary degree was bestowed in a morning ceremony at the Soldier's and Sailor's Memorial Hall on the campus.

After the conferral, Faget conducted a seminar with a group of engineering students at the University. He participated in a groundbreaking ceremony for the new Michael L. Benedum Hall of Engineering and attended a luncheon in his honor.

Faget took part in Wednesday's University of Pittsburgh

Engineer's Week Celebration. He addressed 600 members of the Pitt engineering Alumni at an annual dinner on the campus.

In receiving his honorary degree, Faget was cited for "creative and imaginative guidance which you have provided to this nation's manned spaceflight effort."

He was also recognized for "contributions to design engineering performance of spacecraft which the astronauts have flown and soon will fly and for your efforts to impart your knowledge and experience to others who may follow in your footsteps."



SECOND FRONT PAGE

Apollo Fuel Cell Passes 1000-Hour Run Mark

An Apollo fuel cell completed a marathon run last week at the Manned Spacecraft Center, producing electrical power under thermal vacuum conditions for 1004 hours of operation before shutdown.

For an Apollo mission to the moon and return, the three fuel cells which will be carried in the service module of the spacecraft must produce power continuously for 400 hours.

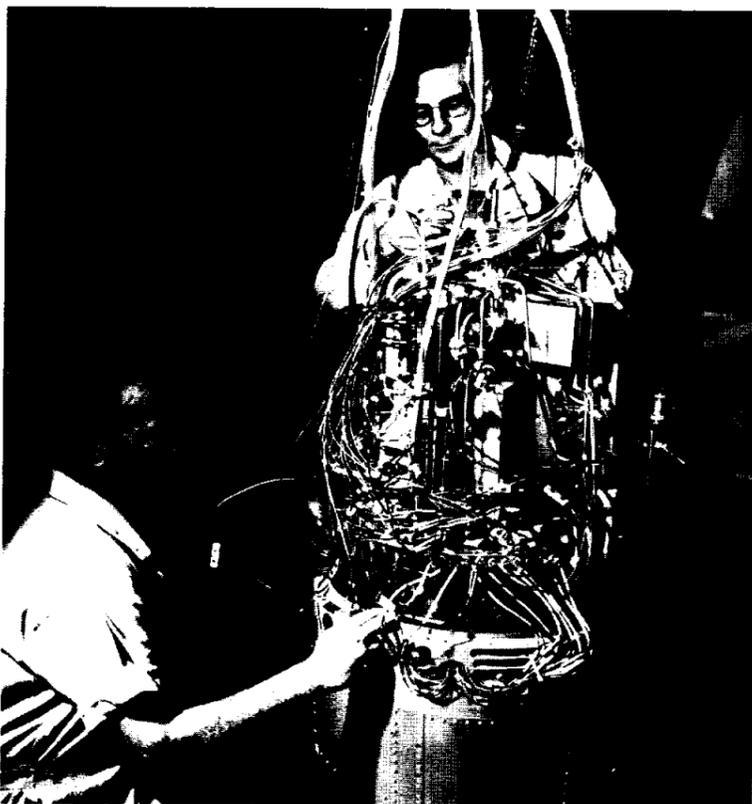
The 1000 hour run was made in two parts. The fuel cell was powered up on October 11, 1964 and ran until October 24, approximately 300 hours. At that point its companion fuel cell was taken off line for repairs, which made it necessary to shut down both units.

The fuel cell was powered up again on February 1, 1966 and ran continuously until March 7, approximately 700 hours. During its 1000 hours, the fuel cell produced 800 kilowatt hours of electricity. For comparison, the average home uses 625 kilowatt hours of electricity each month.

While operation at a simulated altitude of 65 miles, the fuel cell was subjected to temperature extremes ranging from zero to plus 150 degrees Fahrenheit. Operating temperatures in flight are expected to vary between plus 30 degrees and 130 degrees Fahrenheit. Engineers checked the unit constantly to see that it compensated for the different operating temperatures.

Two shifts of six men each from the Therochemical Test Branch of the Propulsion and

Power Division monitored the test facility and the fuel cell during its run. Dewey Hydrick of Thermodynamics Power Section is project officer for the test program. Clarence Propp was in charge of test facility and Shelby Owens was test engineer. The fuel cell for Apollo is built by Pratt and Whitney Aircraft Division of United Aircraft Corporation.



1000-HOUR CLUB—An Apollo fuel cell completed a total of 1004 hours of operation in the Thermochemical Test Branch vacuum chamber before being shut down. Dana York, kneeling, and Bill Michael check instrumentation leads prior to one of the powered-up runs.

Technical Symposium March 28 Program Slanted for Families

Wives and teen-age offspring of MSC and on-site contractor employees are invited to attend the March 28 Technical Symposium at which the latest available Gemini VIII flight film will be shown.

Crew Systems Division is making the Symposium presentations as follows: "Description of Centrifuge," Ralph Drexel; "Development of Survival Equipment," James Barnett; "Gemini VIII Extravehicular Equipment Development," Charles Lutz, and "The Medical Experiments Program," Dr. Lawrence Dietlein. The Symposium begins at 7 pm in the auditorium.



JUDO KUDOS—Winners in the Senior category of the Armed Forces Judo Association NASA Invitational Tournament are: Left row, front to rear, Brown Belt first place Paul Wunsch, Spring Branch; 2nd place John Llewellyn MSC, and 3rd place Larry Fisher, Spring Branch. Right row: White Belt 1st place Ken Anderson, East End YMCA, 2nd place Chuck Maley, Spring Branch, 3rd place Fred Bunch, MSC.

MSC Judokas Take Honors At Invitational Tournament

Two MSC employees placed in the Senior Division of the March 5 Armed Forces Judo Association's NASA Invitational Tournament. Some 60 junior and senior judo enthusiasts from the East End YMCA, Spring Branch and MSC Judo Clubs competed in the tournament.

Taking first place in the Senior Brown Belt category was Paul Wunsch, Spring Branch. John Llewellyn, MSC, was second and Larry Fisher, Spring Branch was third.

In the Senior White Belt competition, Ken Anderson, East End YMCA placed first; Chuck Maley, Spring Branch second, and Fred Bunch, MSC, third.

The MSC team placed first in the overall Junior team standings with 28 points; Spring Branch second with 7 points, and East End YMCA third, 6 points. In Senior team results, Spring Branch was first with 6 points;

MSC second, 4 points, and East End YMCA third, 3 points.

In the Junior category, the tournament results were as follows:

Girls: 1st Michele Polman-teer, 2nd Pat Box, and 3rd Peggy Box, all of the MSC Club.

Seven Years: 1st Paul Box, 2nd Mike Anderson, both MSC.

Ten Years: 1st Tim Goodwin MSC, 2nd Mac Pherson EEY, 3rd Mike Fegan MSC.

Eleven Years: 1st Raymond Fuetral SB, 2nd Paul Brown MSC, 3rd Brian Hill SB.

Twelve Years: 1st Mike Howard MSC, 2nd Mike Holmer EEY, 3rd Fritz Lang EEY.

Thirteen Years: 1st Tommy Hoke, 2nd Richard Wood, 3rd Dan Cantrell, all of MSC.

Fourteen Years: 1st Bill Pickett MSC, 2nd Jed Thompson MSC, 3rd Jim Shasted EEY.

Fifteen Years: 1st George Manahan SB, 2nd Richard Butler MSC, 3rd Doug Howard MSC.